

CLAIMS

WE CLAIM AS OUR INVENTION:

1. A delivery system for placing high viscosity material to a selected site in the human body, comprising:
 - a cannula having an axis and an opening for introducing high viscosity material to the selected site;
 - a dispenser for dispensing the high viscosity material from the cannula by introducing pressure upon the high viscosity material within the cannula;
 - a body member having a delivery axis and comprising a reservoir in fluid communication with the cannula, the body member being configured to transfer the high viscosity material from the reservoir into the cannula, and a second opening for receiving the high viscosity material into the reservoir; and
 - a transfer member in communication with the second opening, the transfer member configured for transferring the high viscosity material from the reservoir into the cannula via the first opening,
 - and wherein the cannula axis and the body member axis cross at a non-linear angle.
2. The system of claim 1 wherein the dispenser comprises a manually, pneumatically, or hydraulically actuated plunger.
3. The system of claim 1 wherein the dispenser comprises a rod axially slidable through the cannula.
4. The system of claim 1 wherein the dispenser comprises a rod attached to a tip on one end and a cap on the other end.
5. The system of claim 4 wherein the dispenser further comprises a break-away hub that is placed between the rod and the tip.

6. The system of claim 1 wherein the dispenser provides pressure by compressed gas.
7. The system of claim 1 wherein the transfer member comprises a manually, pneumatically or hydraulically actuated plunger.
8. The system of claim 1 wherein the transfer member provides pressure by compressed gas.
9. The system of claim 1 wherein the cannula has an inner diameter in the range of 1 mm to 20 mm.
10. The system of claim 1 wherein the cannula has an inner diameter in the range of 1 mm to 6 mm.
11. The system of claim 1 wherein the cannula has an outer diameter in the range of 2 mm to 10 mm.
12. The system of claim 1 wherein the cannula has a length of in the range of 5 cm to 35 cm.
13. The system of claim 1 wherein the cannula has a length in the range of 10 cm to 25 cm.
14. The system of claim 1 wherein the non-linear angle is in the range of 30 degrees to 150 degrees or 210 degrees to 330 degrees.
15. The system of claim 1 wherein the non-linear angle is in the range of 50 degrees to 130 degrees or 230 degrees to 310 degrees.
16. The system of claim 1 wherein the non-linear angle is in the range of 70 degrees to 110 degrees or 250 degrees to 290 degrees.

17. The system of claim 1 wherein the reservoir is adapted to removably receive a container filled with a high viscosity material.

18. The system of claim 17 wherein the container is removably received by the reservoir by means of threads or luer lock.

19. The system of claim 18 wherein the container is a syringe, cartridge, ampoule, or capsule.

20. The system of claim 1 wherein the reservoir is directly fillable with a high viscosity material.

21. The system of claim 1 further comprising physical handles.

22. The system of claim 21 wherein the physical handles comprise an ergonomic grip, a syringe grip, or a combination thereof.

23. The system of claim 1 further comprising a split resistance cap.

24. The system of claim 1 wherein the cannula further comprises markers.

25. The system of claim 24 wherein the markers are radiopaque.

26. The system of claim 1 wherein the body member further comprises markers.

27. The system of claim 26 wherein the markers are radiopaque.

28. The system of claim 1 wherein the cannula and the body member comprise stainless steel, polycarbonate, polypropylene, polyethylene, PTFE, or a combination thereof.

29. A minimally invasive tissue regeneration material delivery system comprising:
a cannula;

a dispenser for dispensing the tissue regeneration material comprising a cap, rod, a breakaway hub, and a tip;

a body member having a first opening that is in communication with the cannula, a reservoir for removably receiving the tissue regeneration material, and a second opening; and

an open bore syringe filled with the tissue regeneration material that is removably connected to the reservoir;

a plunger for transferring the tissue regeneration material from the body member into the cannula via the first opening,

wherein the dispenser is associated with the cannula, the plunger is in communication with the second opening, and the cannula, and the body member are connected in a non-linear angle in the range of 70 degrees to 110 degrees or 250 degrees to 290 degrees.

30. A method for delivering high viscosity material comprising:

1.) providing a high viscosity material delivery system comprising:

a.) a cannula;

b.) a dispenser for dispensing a high viscosity material;

c.) a body member having a first opening that is in communication with the cannula, a reservoir for receiving a high viscosity material, and a second opening; and

d.) a transfer member for transferring the high viscosity material from the body member into the cannula via the first opening,

wherein the dispenser is associated with the cannula, the transfer member is in communication with the second opening and the cannula and the body member are connected in a non-linear angle;

2.) placing the high viscosity material into the reservoir;

3.) actuating the transfer member to transfer the high viscosity material from the reservoir into the cannula via the first opening; and

4.) actuating the dispenser to dispense the high viscosity material from the cannula.